

# Convergence

in Information and  
Communication Technology

STRATEGIC AND REGULATORY  
CONSIDERATIONS

Rajendra Singh and Siddhartha Raja



**THE WORLD BANK**  
Washington, D.C.

# Contents

|  |           |
|--|-----------|
| Foreword   | vii       |
| Acknowledgments  | ix        |
| About the Authors  | xi        |
| Abbreviations  | xiii      |
| <b>1 Introduction</b>  | <b>1</b>  |
| Convergence Continues to Gain Momentum Worldwide               | 1         |
| Responding to Convergence                                      | 4         |
| Notes  | 7         |
| <b>2 Thinking Strategically about ICT Convergence</b>          | <b>9</b>  |
| Understanding Convergence                                      | 9         |
| Convergence Is Reality   | 10        |
| Opportunities and Challenges of Convergence for the ICT Sector | 14        |
| Options for Policy Responses                                   | 20        |
| Nothing Endures but Change                                     | 30        |
| Notes  | 31        |
| <b>3 Emerging Regulatory Responses to Multiple Play</b>        | <b>33</b> |
| Supply of and Demand for Multiple-Play Services Are Growing    | 34        |
| Multiple-Play Challenges in Legacy Regulatory Frameworks       | 36        |
| What Role Should Regulatory Frameworks Play?                   | 38        |
| Implementing the Regulatory Response                           | 39        |
| Crucial Principles for an Enabling Regulatory Environment      | 41        |
| Authorizations   | 49        |
| Spectrum Management  | 63        |
| Interconnection and Access                                     | 72        |
| Universal Service  | 85        |

|   |            |
|---|------------|
| Regulatory Agencies   | 93         |
| Conclusion  | 98         |
| Notes   | 101        |
| <b>References and Other Resources</b>   | <b>105</b> |
| <b>Index</b>  | <b>117</b> |
| <br>  |            |
| <b>Boxes</b>  |            |
| 2.1 Convergence in Developing Countries: A Few Examples   | 12         |
| 2.2 The Impact of an Enabling Environment for<br>Convergence: Wireline Telephony and Job Creation                           | 26         |
| 3.1 Examples of Multiple Play in Developing Countries   | 35         |
| 3.2 Consultations Can Build Support for and Strengthen<br>Regulatory Responses  | 40         |
| 3.3 How Competition in Telecommunications Affects<br>Growth and Consumer Costs: Lessons from India<br>and the United States | 45         |
| 3.4 The Benefits of an Open Licensing Regime:<br>The Case of VoIP   | 53         |
| 3.5 Malaysia's Simplified Licensing Framework   | 57         |
| 3.6 Japan's Move to an IP-Based Environment   | 80         |
| 3.7 The Potential Gap in Next-Generation Networks   | 91         |
| <br>  |            |
| <b>Figures</b>  |            |
| 3.1 Globally, Mobile Telephones Surpassed<br>Fixed Lines in 2002  | 64         |
| 3.2 Many Cellular Operators Derive a Large Share<br>of Revenues from Wireless Data Services                                 | 66         |
| <br>  |            |
| <b>Tables</b>   |            |
| 2.1 Forms of ICT Convergence  | 11         |
| 2.2 Government Responses to Convergence around<br>the World   | 22         |
| 3.1 Some Examples of Regulatory Impediments<br>to Multiple Play   | 38         |
| 3.2 Summary Results of a Survey of Six Countries  | 42         |
| 3.3 Evolving License Types to Authorize Service<br>Providers' Operations  | 50         |